इंटरनेट मानक

Disclosure to Promote the Right To Information

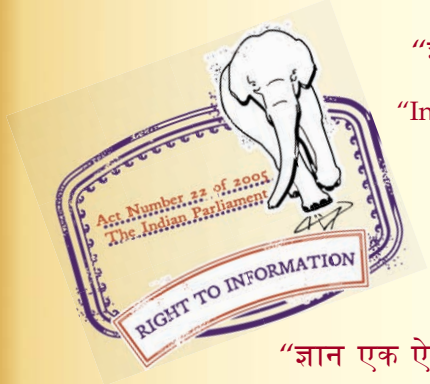
Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जानने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 6556 (1972): Specification for Dental Impression Plaster [MHD 8: Dentistry]

"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
"Invent a New India Using Knowledge"



"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

BLANK PAGE

PROTECTED BY COPYRIGHT

"पुनर्पुष्टि १९९२"
"RE-AFFIRMED 1992"

IS : 6556 - 1972
(Reaffirmed 1998)

Indian Standard

SPECIFICATION FOR DENTAL IMPRESSION PLASTER

UDC 615·463 : 616·314

© *Copyright* 1972

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 1

Price Rs 5·00 Gr 3

August 1972

Indian Standard

SPECIFICATION FOR DENTAL IMPRESSION PLASTER

Dental Materials Sectional Committee, CDC 52

Chairman	*Representing*
COL N. N. BERY	Ministry of Health & Family Planning
Members	
DR N. K. AGRAWAL	In personal capacity (*Dental College & Hospital, Lucknow*)
DR P. K. BASU	Dr Ahmed Dental College & Hospital, Calcutta
SHRI J. B. GIBBONS	Dental Products of India Ltd, Bombay
SHRI DESMOND DE BEYNAC SHEEN (*Alternate*)	
DR (MRS) T. M. S. GINWALLA	Nair Hospital & Dental College, Bombay
DR F. D. MIRZA (*Alternate*)	
DR R. C. KAKAR	In personal capacity (*31 South Patel Nagar, New Delhi*)
DR G. N. KOTHARE	Unichem Laboratories Ltd, Bombay
SHRI P. G. VYAS (*Alternate*)	
SHRI BHUPENDRA B. PATEL	Dental Corporation of India, Bombay
SHRI NARENDRA M. PATEL (*Alternate*)	
SHRI D. G. PATWARDHAN	Directorate General of Technical Development, New Delhi
DR G. B. SHANKWALKAR	Government Dental College and Hospital, Bombay
BRIG WARDEV SINGH	Directorate General, Armed Forces Medical Services (Ministry of Defence)
SHRI D. DAS GUPTA, Director (Chem)	Director General, ISI (*Ex-officio Member*)

Secretary

DR G. M. SAXENA
Deputy Director (Chem), ISI

Denture Materials Subcommittee, CDC 52 : 2

Convener	
BRIG WARDEV SINGH	Directorate General, Armed Forces Medical Services (Ministry of Defence)
Members	
DR N. K. AGRAWAL	In personal capacity (*Dental College & Hospital, Lucknow*)
SHRI J. B. GIBBONS	Dental Products of India Ltd, Bombay
SHRI S. R. SETHNA (*Alternate*)	
DR INDERJIT SINGH	Safdarjang Hospital, New Delhi
DR G. N. KOTHARE	Unichem Laboratories Ltd, Bombay
SHRI P. G. VYAS (*Alternate*)	

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 1

Indian Standard

SPECIFICATION FOR DENTAL IMPRESSION PLASTER

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 5 April 1972, after the draft finalized by the Dental Materials Sectional Committee had been approved by the Chemical Division Council.

0.2 In the preparation of this standard, considerable assistance has been obtained from the following standards:

T 4-1951 Dental impression plaster. Standards Association of Australia.

BS 4598-1970 Dental impression plaster. British Standards Institution.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

---

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for plaster of paris used for taking impressions of the oral tissues in dentistry.

2. REQUIREMENTS

2.1 Description — The plaster shall consist essentially of finely powdered high quality calcium sulphate hemihydrate. It shall be smooth in texture and free from lumps and undesirable foreign materials. The dental impression plaster shall be pink.

---

*Rules for rounding off numerical values (*revised*).

2.2 Clinical Requirements — Intra-oral impressions made using mixed plaster prepared in the manner prescribed in **A-2** shall be accurate in detail and shall, after setting, break with a clean fracture so that the impressions may be accurately re-assembled.

2.3 Particle Size — The particle size shall be such that when the plaster is tested in the manner prescribed in **A-3**, no material is retained on a 600-micron IS Sieve and not more than 2 percent is retained on a 150-micron IS Sieve.

2.4 Setting Time — The initial setting time of the mixed plaster, determined in the manner prescribed in **A-4**, shall be not less than 2·5 minutes nor more than 5 minutes and shall not differ by more than one-half minute from the setting time certified by the manufacturer.

2.5 Linear Expansion on Setting — The mixed plaster, when tested in the manner prescribed in **A-5**, shall neither contract nor exhibit a linear expansion of more than 0·2 percent two hours after it has developed its initial set.

2.6 Compressive Strength — The ultimate compressive strength of the mixed plaster 10 minutes after the commencement of the mixing procedure, determined in the manner prescribed in **A-6**, shall be not less than 20 kg/cm^2 nor more than 70 kg/cm^2.

3. PACKING AND MARKING

3.1 Packing — The material shall be packed as agreed to between the purchaser and the supplier.

3.2 Marking — The packages shall be marked with the following information:

a) Name of the material;

b) Mass of contents in the package;

c) Manufacturer's name and recognized trade-mark, if any; and

d) Setting time of the material.

3.2.1 The packages may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 The method of preparing samples of the material and the criteria for conformity shall be as given in Appendix B or as agreed to between the purchaser and the supplier.

APPENDIX A

(Clauses 2.2 to 2.6)

METHODS OF TEST FOR DENTAL IMPRESSION PLASTER

A-1. TEST CONDITIONS

A-1.1 Carry out always the mixing and testing of plaster in a room free from draughts and in which the ambient atmosphere conditions are as follows:

a) Temperature	27 ± 2°C
b) Relative humidity	55 to 75 percent

A-2. PREPARATION OF PLASTER FOR TESTING

A-2.1 Materials and Apparatus — All apparatus and instruments shall be clean, dry and free from particles of hardened plaster. Before starting mixing of the plaster bring the materials and apparatus to a temperature of 27 ± 2°C. Maintain the freshly prepared specimens at a temperature within this range until testing is commenced.

A-2.2 Method of Mixing — Within a period of approximately 10 seconds, sprinkle from a suitable container 200 g of plaster contained in a rubber bowl of approximately 15 cm dia, into the determined quantity of water (*see* **A-2.3**), in such a manner that the entrapment of air is avoided as far as possible. During the next 20 seconds vibrate the bowl slightly to facilitate wetting of the plaster and to remove as much entrapped air as possible. Mix the ingredients using a spatula with stainless steel alloy blade approximately 25 mm width, at the rate of two to three cycles per second for 30 seconds (a total of 60 to 90 cycles) using a circular stirring motion. Immediately transfer the mixed plaster to the moulds or testing apparatus.

A-2.3 Determination of Plaster-Water Ratio Producing the Standard Testing Consistency

A-2.3.1 *Apparatus*

A-2.3.1.1 *Falling plate consistometer* — as illustrated in Fig. 1. The metal cylinder *A* has an internal diameter of 30 mm and a height of

50 mm, and rests on a horizontal metal spread plate *C*. The metal cylinder is held by a clamp *B* separately from the spread plate, which can be allowed to fall at a constant rate of approximately 10 mm per second (unloaded) by operating the stopcock *D*.

A-2.3.1.2 *Calipers* — for measuring diameter of spread.

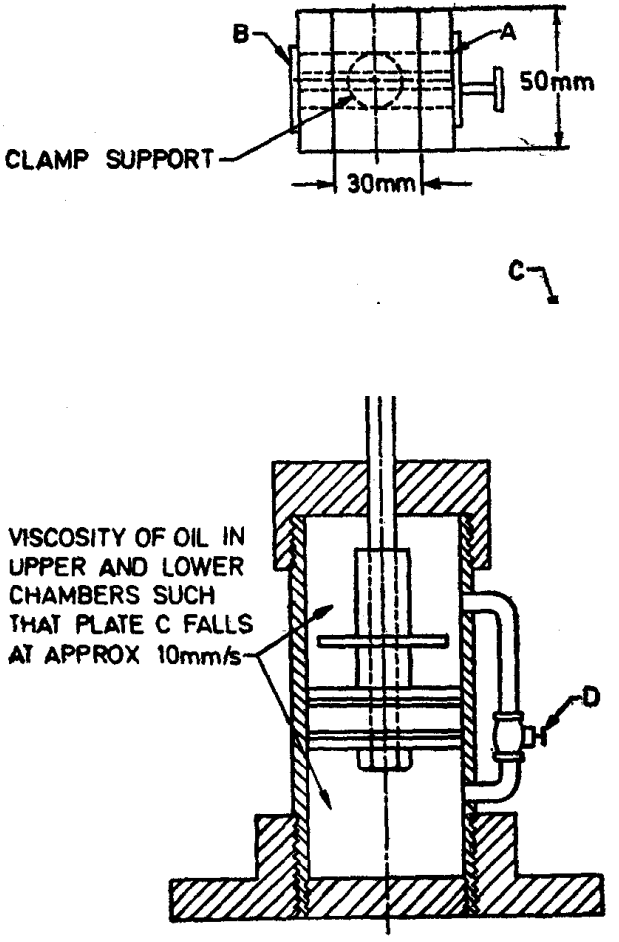


FIG. 1 FALLING PLATE CONSISTOMETER

A-2.3.2 *Reagent*

A-2.3.2.1 *Trisodium citrate*

A-2.3.3 *Procedure* — Place 130 ml of water in the rubber bowl and add 0·4 g of sodium citrate to act as a retarder. Stir until this has completely

dissolved, then add the plaster and mix, as described in **A-2.2.** Pour the mixed plaster into the cylinder, resting on the spread plate of the consistometer, and strike off level. Ninety seconds after initial contact of plaster and water allow the plate to fall away from the cylinder by opening the stopcock. Measure the maximum and minimum diameters of the spread and record the mean.

A-2.3.3.1 Repeat this procedure, varying the amount of water used until a spread of 78 to 80 mm is obtained. Note the amount of water required to produce this spread, when mixed with 200 g of plaster, as that producing the standard testing consistency. Use this ratio, and 200 g of plaster (but omitting the sodium citrate) for all the tests, even if, in some procedures, the full amount is not required.

NOTE 1 — If after the initial test a large adjustment of plaster-water ratio is required when determining consistency, this can be carried out by adding more water to the gauged plaster, remixing and redetermining the spread. When the correct spread has been reached, repeat the test using the determined plaster-water ratio and confirm the spread.

NOTE 2 — Maintain the spread plate in a dry polished condition between tests.

NOTE 3 — Only use the sodium citrate when determining the plaster-water ratio.

A-3. DETERMINATION OF RESIDUE ON SIEVING

A-3.1 Procedure — Place 100 g of plaster on a 600-micron IS Sieve (*see* IS:460-1962*) and shake through on to a 150-micron IS Sieve. Wash through the material on this sieve by agitating the sieve in a vessel containing absolute alcohol (*see* Note). Wash the residue with a stream of fresh alcohol until the washings are clear. Dry the sieve at room temperature. When the residue is dry, shake the sieve gently by hand for approximately one minute to remove fine particles adhering to the sieve.

NOTE — Denatured spirit is satisfactory for this purpose.

A-3.2 Remove any residue remaining on the respective sieves, weigh and report as the percentage retained.

A-4. DETERMINATION OF SETTING TIME

A-4.1 Apparatus

A-4.1.1 *Gillmore Initial Needle* — conforming to the following requirements:

a) Mass 110·0 ± 0·5 g
b) Diameter 2·10 ± 0·05 mm

*Specification for test sieves (*revised*).

The needle tip shall be cylindrical for a distance of approximately 5 mm. The needle end shall be plane and at right angles to the axis of the rod and shall be maintained in a clean condition.

A-4.1.2 *Metal Ring Mould* — cylindrical, of internal diameter 20 mm and height 5 mm.

A-4.2 Procedure — Carry out the test described in triplicate. Place the metal ring mould on a flat plate and fill it with plaster mixed in the manner prescribed in **A-2**. Carefully lower vertically the Gillmore needle on to the horizontal surface of the plaster and allow to rest thereon under its own mass. Repeat this at frequent intervals. The plaster shall be deemed to have developed its initial set when the needle fails to leave a perceptible circular indentation on the surface of the specimen. It is essential to select a fresh area of the plaster surface for each indentation and to keep the needle clean. Record the time from the moment of first contact of plaster with water to the nearest one-fourth minute.

A-4.2.1 Report the setting time as the mean of three determinations. If any result diverges by more than 20 percent from the mean, repeat the whole test.

A-5. DETERMINATION OF LINEAR EXPANSION ON SETTING

A-5.1 Apparatus

A-5.1.1 *Extensometer* — essentially as illustrated in Fig. 2, the dial gauge of which is essentially free-moving with no internal mechanism or springs which could effectively influence the expansion of the plaster in the cradle. To prevent plaster sticking to the sides of the cradle, grease the interior surface before use and line with thin non-absorbent paper which has a glazed surface. Renew the paper lining for each test.

A-5.1.2 *Container* — into which the extensometer may be placed and stored in an atmosphere of high relative humidity. It is suggested that a plastics box with an air-tight lid, containing water to a depth of approximately 2 to 3 mm, be used, but any enclosed space which will effectively prevent dehydration of the specimen during the test procedure may be used.

A-5.2 Procedure — Carry out the test in triplicate. Fill the cradle of the extensometer with plaster of standard consistency and strike off level. Ensure that the movable end plate is slightly clear of the cradle and that the plaster is in close contact with this plate. Zero the dial gauge, place the extensometer in the container (*see* **A-5.1.2**), add the water and close the lid. Leave undisturbed at a temperature of 27 ± 2°C for a period of two hours, measured from the first contact of plaster and water, and then take a dial reading.

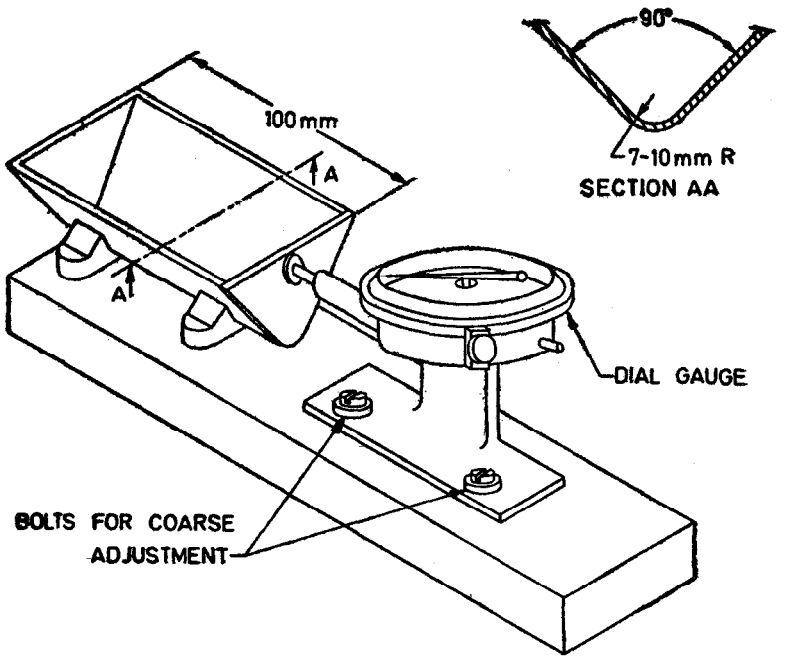


FIG. 2 EXTENSOMETER APPARATUS

A-5.2.1 Calculate the test result as follows:

$$\text{Setting expansion, percent} = \frac{\text{dial reading in 0·01 mm}}{100}$$

A-5.2.2 Report the setting expansion as the mean of three determinations. If any result diverges by more than 20 percent from the mean, repeat the whole test.

A-6. DETERMINATION OF COMPRESSIVE STRENGTH

A-6.1 Apparatus — Any device for the testing of compressive strength.

A-6.2 Preparation of Test Specimens — The specimens of plaster used for this test shall be cubes of 25 mm side. Prepare five such specimens by casting plaster, mixed in the manner described in **A-2**, into split moulds set vertically on metal or glass plates. Do not cast the cubes successively but move the containing vessel back and forth over the moulds while pouring is in progress. Work the plaster in the moulds

slightly to remove air bubbles and then level off flush with the top of the moulds. After the specimens have become sufficiently hard to handle, remove them from the moulds.

A-6.3 Procedure — Ten minutes after the commencement of the mixing procedure, determine the compressive strength of the specimens by means of the testing machine. Record the mean of the compressive strength of the five specimens as the compressive strength of the plaster; except that if the compressive strength of one or two of the specimens differs by more than 15 percent from the mean of the five, discard them and report the compressive strength as the average of the remaining specimens. If the compressive strength of three or more of the specimens differs by more than 15 percent from the mean discard all the results and repeat the test.

APPENDIX B

(*Clause* 4.1)

SAMPLING OF DENTAL IMPRESSION PLASTER

B-1. GENERAL REQUIREMENTS OF SAMPLING

B-1.0 In drawing, preparing, storing and handling test samples, the precautions and directions given in **B-1.1** to **B-1.7** shall be observed.

B-1.1 Samples shall not be taken in an exposed place.

B-1.2 The sampling instrument shall be clean and dry.

B-1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

B-1.4 To draw a representative sample, the contents of each container selected for sampling shall be mixed as thoroughly as possible by suitable means.

B-1.5 The samples shall be placed in clean, dry, air-tight glass or other suitable containers.

B-1.6 The sample containers shall be of such size that they are almost completely filled by the sample.

B-1.7 Each sample container shall be sealed air-tight with a suitable stopper after filling, and marked with full details of sampling, the date of sampling and the year of manufacture of the material.

B-2. SCALE OF SAMPLING

B-2.1 Lot — All the containers in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot. If a consignment is declared or known to consist of different batches of manufacture the containers belonging to the same batch shall be grouped together and each such group shall constitute a separate lot.

B-2.1.1 Samples shall be tested from each lot for ascertaining conformity of the material to the requirements of this specification.

B-2.2 The number of containers n to be chosen from the lot shall depend on the size of the lot N and shall be as given in Table 1.

TABLE 1 NUMBER OF CONTAINERS TO BE SELECTED FOR SAMPLING

LOT SIZE	NUMBER OF CONTAINERS TO BE SELECTED
N	n
(1)	(2)
3 to 50	3
51 ,, 200	4
201 ,, 400	5
401 ,, 650	6
651 ,, 1 000	7

B-2.3 The containers to be selected for sampling shall be chosen at random from the lot and for this purpose, random number tables shall be used. In case such tables are not available, the following procedure may be adopted:

Starting from any container, count them as 1,2,3,.....,r and so on in a systematic manner, where r is the integral part of N/n. Every rth container thus counted shall be withdrawn from the lot.

B-3. TEST SAMPLES AND REFEREE SAMPLE

B-3.1 Preparation of Test Samples

B-3.1.1 Draw with an appropriate sampling instrument a small portion of the material from different parts of each container selected (*see* Table 1). The total quantity of the material drawn from each container shall be sufficient to conduct the tests for all the characteristics given under **2** and shall be not less than 250 g.

B-3.1.2 Thoroughly mix all portions of the material drawn from the same container. Out of these portions, equal quantities shall be taken from each selected container and shall be well mixed up together so as to form a composite sample weighing not less than 0·5 kg. This composite sample shall be divided into three equal parts, one for the purchaser, another for the supplier and the third for the referee.

B-3.2 Referee Sample — The referee sample consists of a composite sample marked for this purpose and shall bear the seal of the purchaser and the supplier. It shall be kept at a place agreed to between the purchaser and the supplier and shall be used in case of dispute between the two.

B-4. TESTS

B-4.1 Tests for all characteristics given in **2** shall be conducted on the composite sample.

B-5. CRITERIA FOR CONFORMITY

B-5.1 A lot shall be declared as conforming to this specification if the composite sample satisfies the requirements for each of the characteristics listed in **2**. If the requirements for any of the characteristics are not met, the lot shall be declared to have not satisfied the requirements of the specification.

INDIAN STANDARDS

ON

Dental Materials and Allied Products

IS:

3571-1966	Dental gold solders
3578-1966	Dental gold alloy wire
3610-1966	Dental gold foil
4705-1968	Dental mercury
4799-1968	Dental casting gold alloys
5954-1970	Dental white gold alloys
6035-1970	Zinc phosphate dental cement
6036-1970	Alginate dental impression material
6037-1970	Zinc oxide-eugenol dental impression paste
6038-1970	Dental impression compound
6039-1970	Zinc oxide-eugenol dental cement
6043-1970	Copper phosphate-zinc phosphate dental cement
6555-1972	Dental laboratory plaster

PUBLICATIONS OF INDIAN STANDARDS INSTITUTION

INDIAN STANDARDS

Over 6 500 Indian Standards covering various subjects have been issued so far. Of these, the standards belonging to the Chemical Group fall under the following categories:

Acids
Adhesives
Alcohols and allied products
Alkalis
Brushware
Ceramicware, enamelware and laboratory porcelain
Chemical hazards and safety
Chemicals, inorganic (miscellaneous)
Chemicals, organic (miscellaneous)
Coal and coke
Coal carbonization products
Coated fabrics
Cosmetics and toilet goods
Drying oils
Dye intermediates
Electroplating chemicals
Explosive and pyrotechnic materials
Fertilizers
Fillers, stoppers and putties
Footwear
Glass and glassware
Industrial gases
Inks and allied products
Laboratory glassware thermometers and related apparatus
Lac and lac products
Leather, leather goods and leather dressings
Linters and allied products
Lubricants and related products
Oil pastes
Oils & fats, oleaginous seeds and fruits
Painters' materials (miscellaneous)
Paper and its products
Paper and pulp board packaging materials
Perfumery materials, natural and synthetic
Petroleum and petroleum products
Photographic chemicals
Pigments and extenders
Plastics
Polishes
Printing inks
Ready mixed paints and enamels
Rubber and rubber products
Soaps and other surface active agents
Tanning materials and allied products
Thermal insulation materials
Thinners and solvents
Varnishes and lacquers
Water and water treatment
Water based paints
Unclassified

OTHER PUBLICATIONS

ISI Bulletin (Published Every Month)	
Single Copy	Rs 3·00
Annual Subscription	Rs 25·00
Standards: Monthly Additions	
Single Copy	Re 0·30
Annual Subscription	Rs 3·00
Annual Reports (from 1948-49 Onwards)	Rs 2·00 to 5·00
ISI Handbook, 1972	Rs 20·00

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 1

Telephone : 27 01 31 (20 lines) **Telegrams : Manaksanstha**

Branch Offices :

	Telephone
'Sadhna', Nurmohamed Shaikh Marg, Khanpur	Ahmedabad 1	2 03 91
F Block, Unity Bldg, Narasimharaja Square	Bangalore 2	2 76 49
534 Sardar Vallabhbhai Patel Road	Bombay 7	35 69 44
5 Chowringhee Approach	Calcutta 13	23-08 02
5-9-201/2-A (First Floor), Chirag Ali Lane	Hyderabad 1	5 34 35
117/418 B Sarvodaya Nagar	Kanpur 5	82 72
54 General Patters Road	Madras 2	8 72 78

Printed at Printograph, New Delhi 5, India